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Background Paper

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UNIVERSITY ENROLMENT
PROJECTIONS TO 2000

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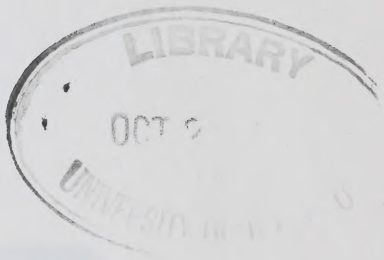

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TABLE OF CONTENTS

SUMMARY AND CONCLUSIONS

The purpose of this paper is to delineate the possible dimensions of changes in university enrolments of Canadians to the year 2000.

A new projection method has been developed for this report, based on the recognition that enrolment can be broken down into various subcategories that consist of persons of different age and sex, and with different aims pursued during their studies.

Also, this method takes account of all age groups in the population in determining enrolments. Traditional practice has been to use one age cohort, such as the number of births lagged by 18 years, or the 18-24 age group, as the demographic determinant of enrolment projections. In fact, this study shows that, for any given participation rate assumption, and given the composition of enrolment as it has evolved since the beginning of the seventies, growth in enrolment projections for the next several years would be lower if the methodology relied on a single age cohort, rather than using the entire relevant demographic age ranges.

Three scenarios are developed: the first is based on the assumption that the 1977-78 participation rates will remain constant over the projection period; the second assumes, based on an extrapolation of underlying participation rate trends, that current trends will continue to 1985-86 and then remain constant thereafter; and the third is a judgemental projection of participation rates based on a subjective analysis of trends in each of the subcategories of enrolment. The judgemental scenario illustrates the impact of various assumptions about future behaviour and provides an alternative to the mechanistic approach used in the other scenarios.

Under scenario 3, incorporating judgemental participation rate assumptions which vary by program, full-time equivalent university-level enrolment, excluding foreign students, would rise from 481,600 in 1977-78 to peak at 505,100 in 1982-83 and then decline steadily to 485,900 in 1985-86, and 446,900 in 1990-91. Enrolments reach a trough in 1995-96 of 429,000 rising to 442,000 by 2000.

It is interesting to note that if one assumes rather steep declines in the male participation rates (as much as 20% to 1985-86) and even if one assumes only moderate increases in female participation rates, increases that are well below the trends of the 1970s, this does not appear to be immediately reflected in enrolment trends. The reason for this is that there is still considerable population growth remaining in the young adult age groups for the next several years. This implies an increase in enrolments for the full and part-time programs which could largely cancel the downward impact of participation rate declines. Also, there remains a considerable amount of demographic pressure on enrolments arising from the growth in the adult population (over age 24), which has a growing propensity to attend university in part-time and graduate programs.

Females have sharply increased their participation in university-level programs, increasing from 39 percent of full-time equivalent enrolments in 1972-73 to 46 percent in 1977-78. In scenario 3, the proportion of females in total university-level enrolments rises to 50 percent by 1985-86, and remains at that level to the year 2000.

Since the completion of this study, two more years of enrolment data (1978-79, and preliminary 1979-80) have become available. The projected enrolments for these two years, using the methodology of this study, appear to be quite close to the actual. This indicates that there is justification in taking account of differences in participation rates for single-year age-sex groups in the different university programs.

INTRODUCTION

The anticipated slowdown in the growth of university enrolments, caused in part by declines in the traditional university age population, raises the question of the impact such changes will have on the future requirements for university teachers. Since the university professoriate perform R&D, these developments will also have an impact on Canada's future R&D manpower capability. It is the object of this paper to review the current situation and provide estimates of future trends in enrolments to the year 2000 under various assumptions[1].

MOSST has developed an HQM simulation model and data base as a basis for examining various manpower issues related to universities. Enrolments are an important part of this data base and it was thus necessary to develop a projection methodology that was consistent with the overall framework.

Existing forecasts and traditional projection approaches were found to have been designed for purposes other than the present one, and could not readily be adapted. Thus a new approach had to be developed.

In keeping with the HQM model, the enrolment simulations are national in scope without regard to differences that may exist among provinces or on a linguistic basis.

The projections presented here are neither predictions nor forecasts, but estimates based on simulations that are conditional on specific assumptions. Their main use is in measuring the implications of various eventualities in a more systematic and internally consistent fashion.

Future enrolment trends depend on two major factors. The first relates to the behaviour of potential students with regard to education and this manifests itself in the participation rates i.e., the proportion of students within a specified category attending university. Although it is not possible to predict exactly how students will behave in the future, it is possible to assume a certain set of behavioural patterns and simulate a result based on this

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[1]This study has greatly benefited from comments made by the Education, Science and Culture Division of Statistics Canada, and Mr. A.L. Darling of McMaster University. Any shortcomings are the responsibility of the authors.

postulate. This approach is taken in this study. Three scenarios are developed based on different assumptions concerning participation rates.

The second factor relates to the changes in the demographic profile of the population. For example, future enrolments will depend on the projection growth in the number of males and females and the changing age structure. Projection of population estimates in turn depends on a series of factors such as immigration and fertility. The population estimates used in this report are taken from "Scenario 3" recently prepared by Statistics Canada. These projections assume a net immigration of 75,000 per year, low fertility and span the years 1976 to 2002.

It has been noted that the number of foreign students at Canadian universities increased significantly during the seventies, particularly at the graduate level[2]. In view of this, the enrolment data are adjusted to exclude these students by age and sex before calculating participation rates[3]. The participation rates and enrolment projections shown in this report, therefore, are for domestic enrolments. Estimates of foreign student enrolments are provided separately.

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[2]See for example, Von Zur-Muehlen, M., (Statistics Canada) "1978-79 Enrolment Trends at Canadian Universities", February 21, 1979.

[3]Participation rate is defined as the proportion of students within a specified category attending university. Explicit delineation of the participation rates are contained in the section entitled "Projection by Category".

THE CURRENT SITUATION

Since the beginning of the seventies, university enrolments have undergone a number of significant changes:

- a decline in male undergraduate full-time enrolment;
- an expansion in female full-time undergraduate enrolment;
- continued expansion of part-time undergraduate and graduate enrolment, both male and female; and
- a decline for males but a rise for females in full-time graduate enrolment.

Also, community colleges became a significant institutional alternative to university-level education, especially in Quebec[4]. University-level "transfer" students currently amount to some 16 percent of total university-level enrolment. Table 1 summarizes the recent levels and composition of university and community college enrolments (on a full-time equivalent basis). Further details on the recent and current enrolment picture are provided in Appendix Table B-1.

The main reasons for the recent changes in student enrolments are well known. A brief summary of the underlying causal factors is provided here, in order to establish a better understanding of the starting point for the projections.

The main factor in the slowdown of male full-time undergraduate enrolment has been a drop in participation rates, rather than the underlying demographic evolution. In the case of male full-time graduate students, the drop in participation rates was extensive enough to more than offset the growth in the underlying population cohort, resulting in an absolute decline in enrolments. In all other enrolment categories (all female, and male part-time), enrolments rose due to a combination of population and participation rate growth. Table 2 quantifies the contribution to total enrolment due to population and participation changes over the period 1972-73 to 1977-78 more extensively.

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[4] In Quebec, the first two years of university must be taken in the CEGEP system. For those students intending further studies at university, therefore, CEGEPs are part of the university system.

TABLE 1

SUMMARY OF UNIVERSITY-LEVEL ENROLMENT
1972/73 TO 1977/78

FULL-TIME EQUIVALENT ENROLMENT (FTE) (A)

	CANADIAN STUDENTS				FOREIGN STUDENTS			TOTAL
	TRANSFER STUDENTS (B)	UNDERGRAD	GRADUATE	TOTAL	UNDERGRAD	GRADUATE	TOTAL	UNIVERSITY LEVEL
1972/73	63,219	299,530	42,710	405,459	8,209	2,990	11,199	416,658
1973/74	68,523	313,111	44,115	425,749	10,187	2,438	12,625	438,374
1974/75	72,387	330,440	39,702	442,529	12,222	3,925	16,147	458,676
1975/76	74,476	352,902	41,602	468,980	16,144	5,059	21,203	490,183
1976/77	76,519	356,058	40,293	472,870	19,632	7,369	27,001	499,871
1977/78	82,477	359,017	40,083	481,577	19,167	7,922	27,089	508,666

SOURCE: APPENDIX TABLES B-1,POST-SECONDARY ENROLMENT AND B-5, FOREIGN STUDENT ENROLMENT

(A) COMBINED ON THE BASIS OF 3.75 UNDERGRADUATE PART-TIME = 1 FULL-TIME; AND 2.5 GRADUATE PART-TIME = 1 FULL-TIME.

(B) ENROLLED AT COMMUNITY COLLEGES

TABLE 2

CONTRIBUTION TO CHANGE IN UNIVERSITY ENROLMENTS (A)
1972/73 TO 1977/78

FULL-TIME EQUIVALENT ENROLMENT

	MALES					FEMALES					TOTAL
	FULL-TIME UNDER-GRAD (B)	PART-TIME UNDER-GRAD	FULL-TIME GRAD	PART-TIME GRAD	TOTAL	FULL-TIME UNDER-GRAD (B)	PART-TIME UNDER-GRAD	FULL-TIME GRAD	PART-TIME GRAD	TOTAL	
ACTUAL 1972/73	201,869	15,500	26,446	5,840	249,655	127,953	17,429	8,459	1,969	155,810	405,465
ACTUAL 1977/78	215,323	19,882	18,740	7,084	261,029	178,850	27,437	10,454	3,805	220,546	481,575
TOTAL GROWTH	13,454	4,382	-7,706	1,244	11,374	50,897	10,008	1,995	1,836	64,736	76,110
HYPOTHETICAL 1977/78 (C)	228,510	18,069	31,072	6,884	284,535	148,217	20,148	9,784	2,288	180,437	464,972
GROWTH DUE TO POPULATION CHANGE	26,641	2,569	4,626	1,044	34,880	20,264	2,719	1,325	319	24,627	59,507
GROWTH DUE TO BEHAVIOURAL CHANGE	-13,187	1,813	-12,332	200	-23,506	30,633	7,289	670	1,517	40,109	16,603

NOTES: (a) Excludes Foreign Students.

(b) Includes University Transfer Students from Community Colleges.

(c) 1977/78 age cohorts and 1972/73 participation rates (1974/75 rates for transfer students).

SOURCE: Data based on, Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals 1972-73 to 1978.

THE BASIS FOR THE PROJECTIONS

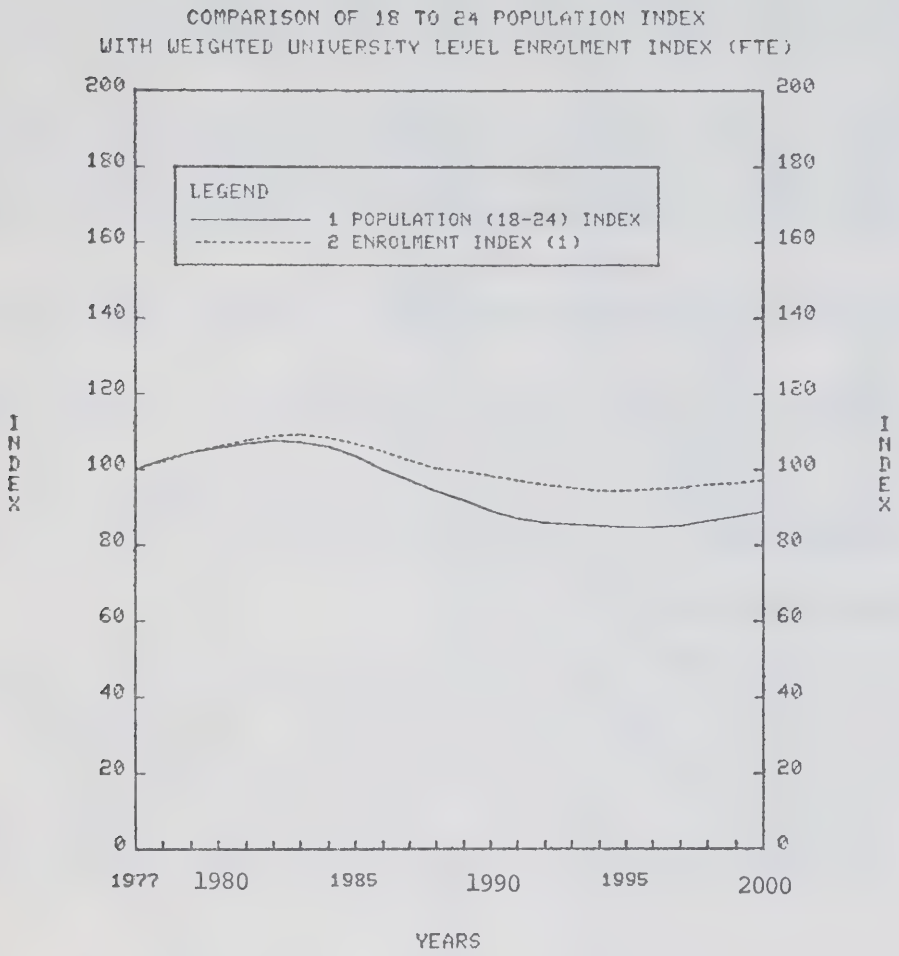
The first characteristic in the composition of current enrolment is the fact that its various categories do not behave in the same manner. Specifically, there are distinct differences in response between the male and female, between the undergraduate and the graduate, and between the full-time and part-time groups. It is useful, therefore, to separate university enrolment into categories with more or less the same behavioural patterns. This facilitates the application of the appropriate projection assumptions to the individual groups. For calculation purposes described in this paper, the following categories of enrolment are identified and treated separately:

- full-time undergraduate, male;
- full-time graduate, male;
- part-time undergraduate, male;
- part-time graduate, male;
- full-time undergraduate, female;
- full-time graduate, female;
- part-time undergraduate, female;
- part-time graduate, female;
- transfer students in community colleges, male;
- transfer students in community colleges, female;
- career students in community colleges, male; and
- career students in community colleges, female.

Another interesting feature of current enrolment is the fact that a significant proportion of the students are outside the 18-24 age range, the range traditionally related to university enrolment. Past projections have used demographic projections of the 18-24 age group, together with assumptions about the ratio of enrolment to the 18-24 population. Given the current composition of enrolment, such estimates lead to misleading results because a large number of students are over 24, and the demographic changes are not the same for all age groups. To demonstrate this point, the index of the 18-24 population to the year 2000 is compared to an index of enrolment based on constant participation rates for all categories and individual ages in Chart 1.

If all demographic age group cohorts were growing at the same rate, an enrolment projection with constant participation rate assumptions would have, by definition, the same index as the 18-24 population. In actual fact, Chart 1

CHART 1



indicates that the enrolment index, weighted by the current participation rates of all the individual age-sex groups, remains considerably above the 18-24 population index, mainly because the age groups over 24 have different patterns.

Furthermore, any enrolment projection, using any other assumption about participation rates, would be affected by the same type of underestimate in the growth of enrolments if the projection was based on the 18-24 population rather than on the extended demographic range used here.

This points to the need for revising the standard projection methodology, not only to avoid underestimating the projections, but also to take account of future demographic changes that would affect the various components of enrolment in different ways.

The projection methodology used here is based, therefore, on the use of:

- components of enrolment that have more or less the same behavioural pattern; and

- participation rates for persons both within and outside the 18-24 age group.

A NEW VIEW OF PARTICIPATION RATES

Statistics Canada maintains computerized records on Canadian university students by sex, single year of age, category of enrolment and many other characteristics. For purposes of the projections described here, an analysis was carried out to determine the differences in the age distributions in the various categories of enrolment, by sex and by single year of age. The analysis was carried out for two recent years (1972-73 and 1977-78). The distributions are shown in Chart 2.

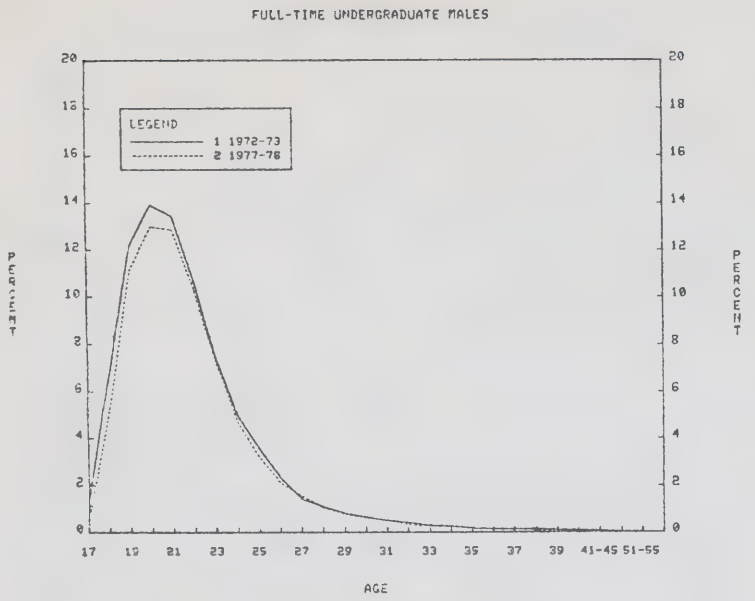
The analysis shows that:

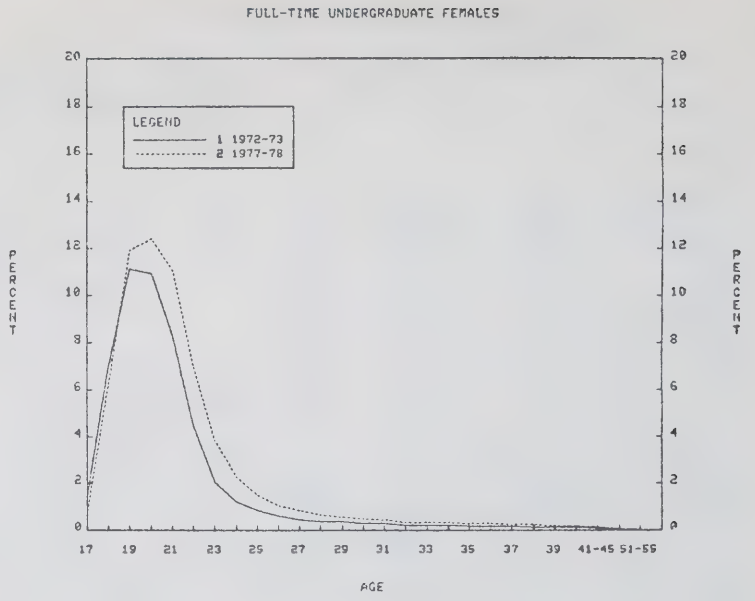
- in none of the eight categories is enrolment restricted to the 18-24 age. In fact, in several categories the largest portion is outside this age range, (e.g., male and female undergraduate part-time; male graduate full-time; and male and female graduate part-time. In the others (male undergraduate full-time, and female graduate full-time) the proportions older than 24 are not insignificant;

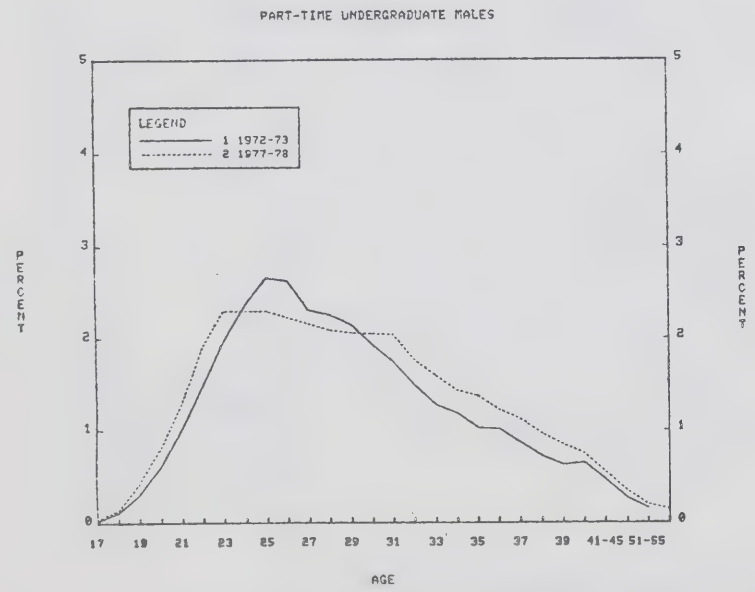
- with the exception of some groups, the nature of the skew of the distribution appears relatively stable over time; the main exception is the participation of female undergraduate part-time students where there has been an increase in the over 26 age groups;

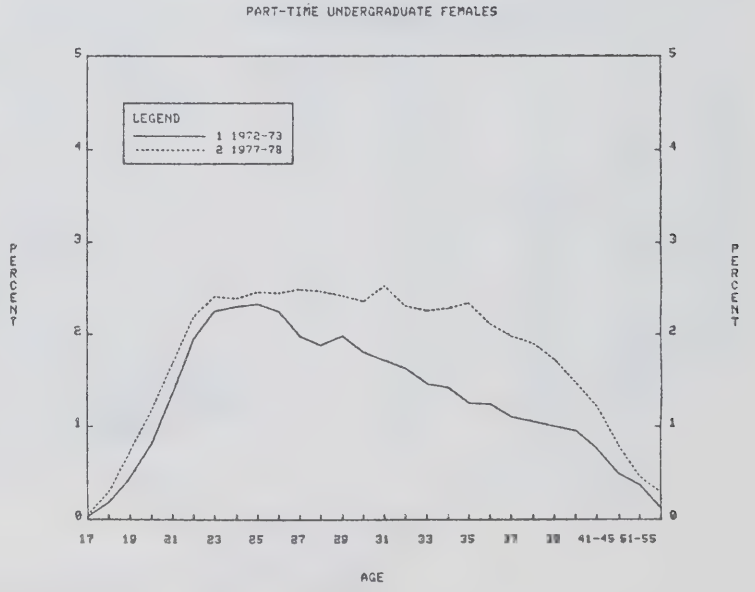
CHART 2

UNIVERSITY PARTICIPATION RATES BY SINGLE YEAR OF AGE





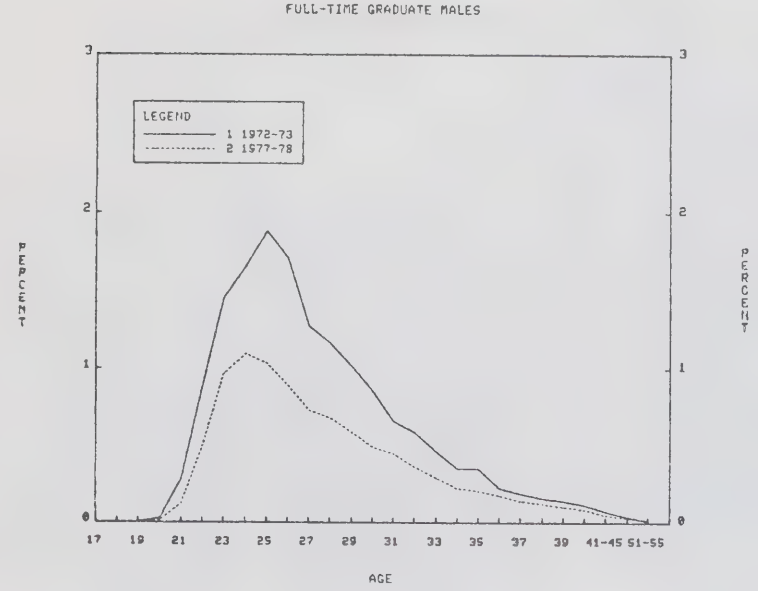


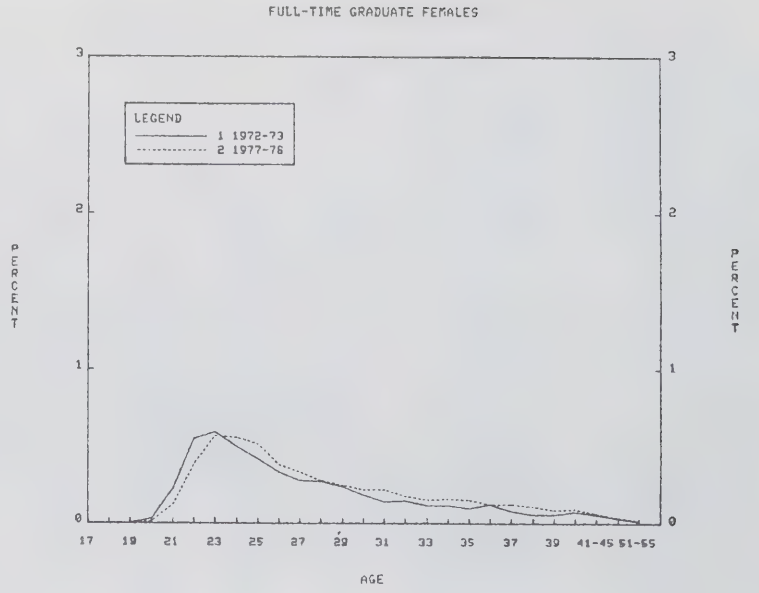


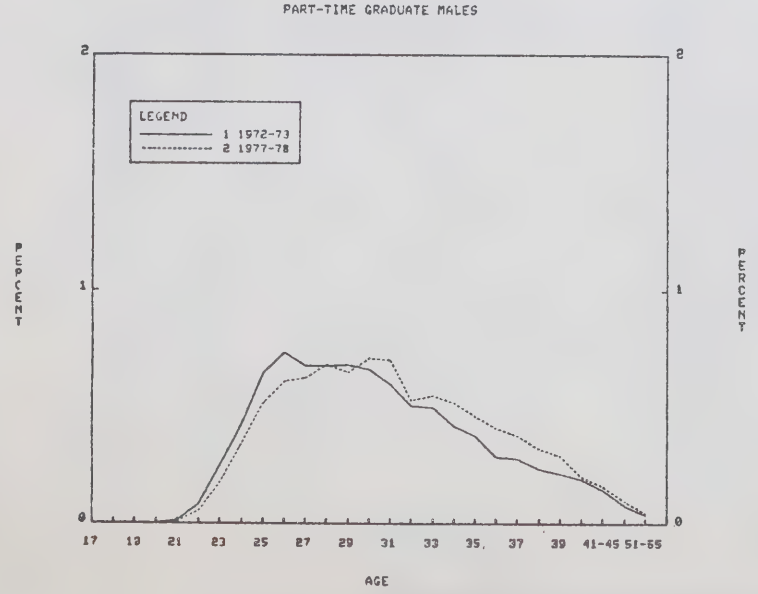
SOURCE: Based on data provided by the Education, Science and Culture Division, Statistics Canada.

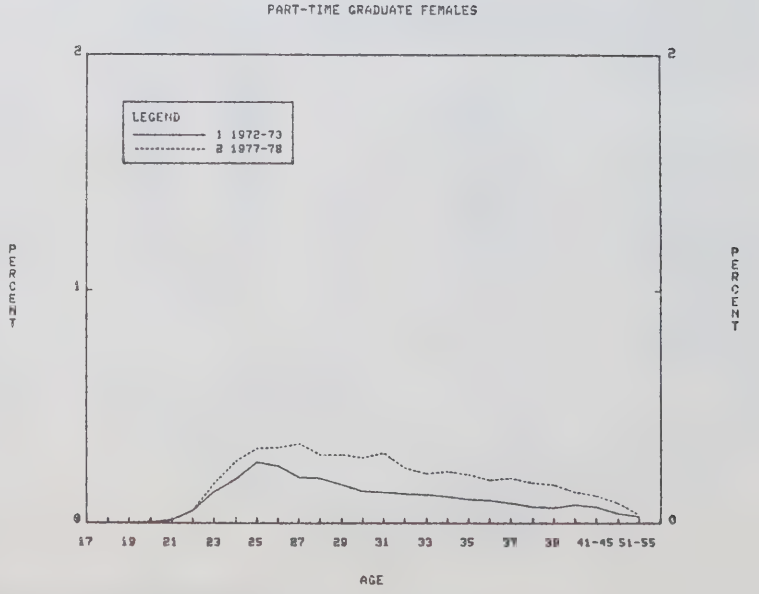
CHART 2 (CONCL'D)

UNIVERSITY PARTICIPATION RATES BY SINGLE YEAR OF AGE









SOURCE: Based on data provided by the Education, Science and Culture Division, Statistics Canada.

- in the case of the female categories, except full-time undergraduates, participation rates have risen, either over the entire distribution span, or in some cases in the older age groups;

- male undergraduate full-time rates have dropped whereas part-time rates have increased for some age groups over this period;

- male graduate full-time rates have fallen, but they have fallen relatively more for the younger than for the older age groups; and

- male graduate part-time rates have risen, especially in the older age range.

ASSUMPTIONS

Apart from the traditional factors affecting the growth and composition of enrolment, such as the relative increase in female participation rates, there are currently several influences that tend to render projection exercises more uncertain than was the case in the past. Some of these factors would have the effect of reducing enrolment rates, while others would have the opposite effect. The following are some of the more frequently cited influences on changes in enrolment rates:

- In total, the starting salaries of new university graduates have fallen in relation to other salaries and wages[5]. This has been interpreted as a falling rate of return to educational investment by university graduates, and this interpretation is thought to reduce the number of persons desiring to attend university compared with the situation when a university education was considered a more profitable investment. Whether it is correct to infer a falling rate of return from changes in starting salaries is questionable, and would need to be further analysed, together with possible changes of life-time earnings profiles. Nevertheless, it appears that there is a pervasive perception that the rate of return has fallen, and it is this perception that may very well discourage participation in further schooling;

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[5] See, for example, Zsigmond, Z., G. Picot, W. Clarke, M.S. Devereaux, "Out of School - Into the Labour Force", June 1978; p. 40, Statistics Canada, Ottawa.

- A tight labour market for young graduates has often been interpreted as having the effect of encouraging people to remain in school longer, especially at the secondary level. This would have the effect of increasing the pool of students qualified to proceed to post-secondary schooling;

- In order to maintain a high level of capacity utilization, the university system is expected to attempt to draw in a large number of part-time students. Indeed, there exists a considerable potential to upgrade the skills of persons who have been in the labour force for some time. This type of factor would tend to raise the participation rates of some age groups;

- Over the past ten years in Ontario, elementary school teachers without a university degree have been encouraged, through salary inducements, to obtain a university degree. This factor has helped raise part-time participation in the past, especially for women, but this process of upgrading has now been largely completed. Because Ontario represents over one-third of total enrolment in Canada, this could offset the above-noted underlying trend for rising part-time enrolment; and

- There has been a large increase in enrolment rates for females age 26 years and over. In many cases these would have been females who had not had the opportunity to engage in full-time study when they were younger because female participation rates tended to be lower. However, with the growth in participation rates for full-time females, one might assume that the rate for older women will decline in the future. On the other hand, some studies of part-time enrolment have suggested that those most likely to enrol are those who previously have engaged in post-secondary education.

Rather than attempt to quantify each of these factors, a task that would probably be quite impossible, instead the approach in the projections has been to work with three separate scenarios that encompass the possible effects of the various factors on participation rates. The following are the specific assumptions underlying the three scenarios:

Scenario I, Constant Participation Rates: The 1977-78 participation rates for all categories of university enrolment remain constant up to 2000;

Scenario II, Continuing Trends: University participation rates for 1978-79 to 1985-86 are based on the participation rates for each category extrapolated using a logarithmic curve trend. From 1985-86 to 2000 the participation rate is held constant; and

Scenario III, Judgemental: This scenario is based on specific assumptions regarding the underlying level of male and female age-specific participation rate profiles for each category. These assumptions were made with reference to Table B-1 which shows the underlying level of enrolments by sex and program for the period 1972-73 to 1977-78. All changes are relative to the 1977-78 base year enrolments and are assumed to take place in equal annual steps.

For projecting community college transfer and career enrolments, the same three sets of assumptions were applied. Here too the basic data are in terms of sex, single-year-of-age groups, and participation rates over the entire age-span (see Appendix Chart C-1).

The single-year-of-age specific participation rates are projected on the assumption that if there are changes, such changes would affect each age class over the entire range to the same extent. This assumption is not inconsistent with the evidence on participation rates presented earlier. The participation rate assumptions are provided in Appendix Tables A-1 to A-4. However, rather than show all the historical and projected detailed single-year-of-age participation rates for the entire 17-60 year age-span for each of the eight university categories and four community college categories, only the projected indices relating to each of the categories are listed in Appendix A. These indices show the ranges that are assumed for all of the individual participation rates in the three scenarios and are representative of the underlying assumptions. The calculations were, of course, carried out in much greater detail.

PROJECTION METHOD

Each of the twelve enrolment categories listed above is projected separately. The projections are the product of the number of males or females projected by single-year-of-age for the entire potential age-range supplying university students (17 to 60 years); and assumptions about age-sex specific participation rates for single-year-of-age and for each of the categories. (The distribution of the recent participation rates over the age-range is shown in Chart 2 above.) An algebraic formulation of the method is provided in Appendix D.

As previously noted, foreign student enrolment increased substantially between 1972-73 and 1977-78. Foreign student enrolment expanded from 2.7 percent of total university full-time equivalent enrolment in 1972-73 to 5.3 percent in 1977-78 (Table 1). In order to obtain domestic participation rates that are not biased upwards by this phenomenon, foreign student enrolment has been excluded from the enrolment data used to calculate participation rates for the three scenarios. Appendix Table B-5 indicates the growth of foreign student enrolment at Canadian universities by year, program and sex.

PROJECTION BY CATEGORY

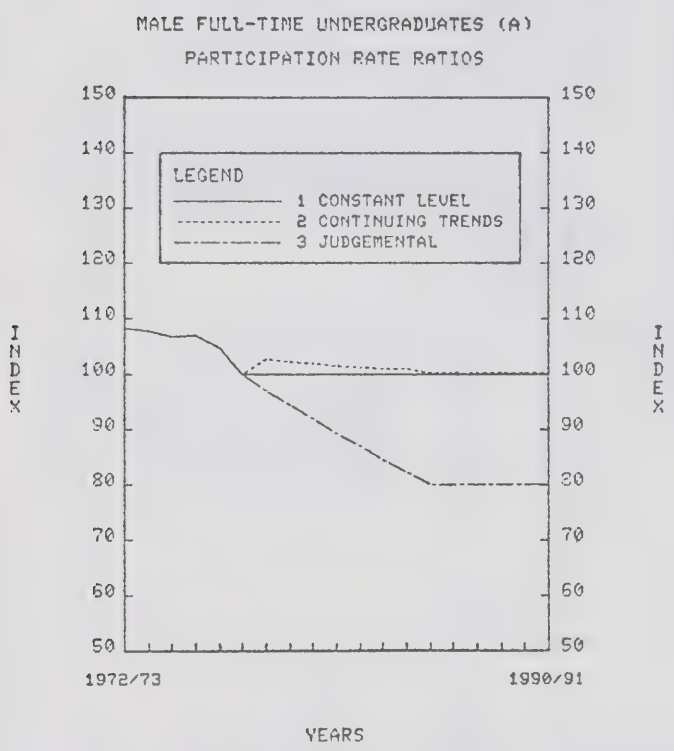
1. Full-time undergraduate males

This is the largest single group. It declined in relative importance from 49.8 percent of total enrolment (FTE) in 1972-73 to 44.8 percent in 1977-78. As is well-known, this shift was caused by the decline in participation rates for this category, while the rates for all other undergraduate categories rose over the same period.

The decline is accounted for, to a certain extent, by the emergence during the sixties of the community college alternative (i.e. the transfer program), which has attracted large numbers of students, especially in Quebec. In the early seventies the substitution process stabilized. Since 1975-76, however, it appears to have accelerated again. Male transfer students had increased by some 8 percent by 1977-78, compared to a 4 percent decline in male full-time enrolments (Table B-1). Enrolments in the two programs stood at 44,679 and 170,644 respectively in 1977-78. (However, see also the section on community college transfer student enrolment below.)

As shown in Chart 3, male full-time undergraduate participation ratios have declined since 1975-76. Both the constant level of participation rates scenario and the continuing trends scenario indicate 1985-86 enrolments of 182,000, an increase of 6 percent over the base level of 171,000. The judgemental scenario is based on a significant decline in participation rates (assumed to amount to 20 percent by 1985-86). Under this assumption, 1985-86 enrolments will decline by 18 percent to 145,000 students. The projection results for the three scenarios are provided in Table 3.

Chart 3



SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

TABLE 3

UNIVERSITY ENROLMENT TRENDS (A)
FULL-TIME UNDERGRADUATE MALES

(THOUSANDS)

		SCENARIO 1	SCENARIO 2	SCENARIO 3
		CONSTANT PART. RATES	CONTINUING TRENDS	JUDGEMENTAL
ACTUAL	1977/78	170.6	170.6	170.6
ANNUAL DATA	1978/79	175.0	180.1	170.1
	1979/80	179.2	183.5	169.5
	1980/81	182.6	186.3	168.0
	1981/82	185.1	188.1	165.5
	1982/83	186.6	189.0	162.3
	1983/84	186.7	188.6	157.9
	1984/85	185.1	187.0	152.4
	1985/86	181.8	182.5	145.4
	1986/87	177.0	177.7	141.6
	1987/88	171.6	172.3	137.3
	1988/89	166.9	167.6	133.5
	1989/90	163.4	164.1	130.7
	1990/91	160.8	161.4	128.6
FIVE-YEAR AVERAGES	1991-1995	154.4	155.0	123.5
	1996-2000	154.4	155.0	123.5

SOURCE: APPENDIX B

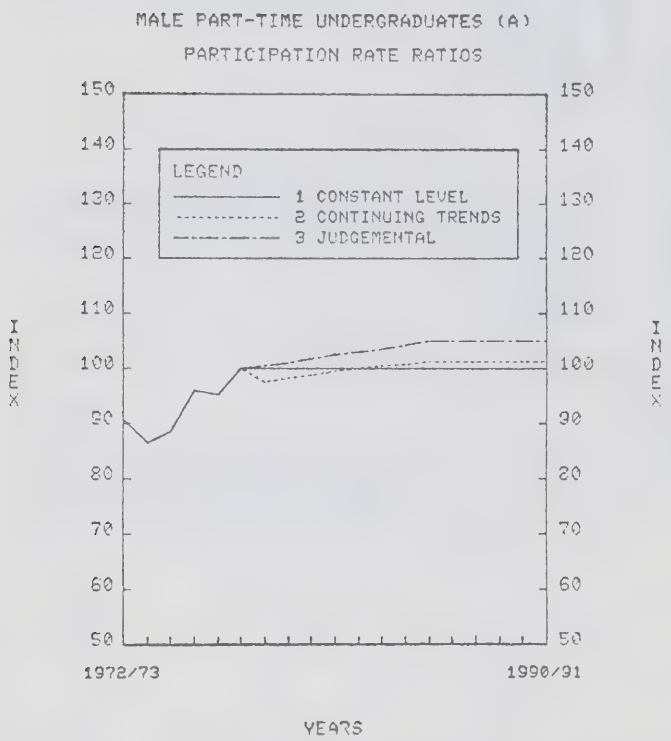
(A) EXCLUDES FOREIGN STUDENTS AND TRANSFER STUDENTS

2. Part-time undergraduate males

Participation rates have been rising steadily in recent years. In the judgemental scenario (scenario 3) it is assumed that the rates will continue to rise, but at a decelerating rate (see Chart 4).

Scenario 3 implies a rise in the number of students from 77,100 in 1978-79 to 92,200 in 1984-85 (see Table 4).

Chart 4



SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

TABLE 4

UNIVERSITY ENROLMENT TRENDS (A)
PART-TIME UNDERGRADUATE MALES

(THOUSANDS)

		SCENARIO 1	SCENARIO 2	SCENARIO 3
		CONSTANT PART. RATES	CONTINUING TRENDS	JUDGEMENTAL
ACTUAL	1977/78	74.6	74.6	74.6
ANNUAL DATA	1978/79	76.7	74.8	77.1
	1979/80	78.7	77.4	79.7
	1980/81	80.8	79.9	82.2
	1981/82	82.8	82.4	84.9
	1982/83	84.8	84.8	87.4
	1983/84	86.7	87.1	89.9
	1984/85	88.3	89.1	92.2
	1985/86	89.8	90.9	94.2
	1986/87	90.9	92.1	95.4
	1987/88	91.8	93.0	96.3
	1988/89	92.3	93.5	96.8
	1989/90	92.5	93.7	97.0
	1990/91	92.5	93.7	97.1
FIVE-YEAR AVERAGES	1991-1995	91.8	93.0	96.3
	1996-2000	89.5	90.7	93.9

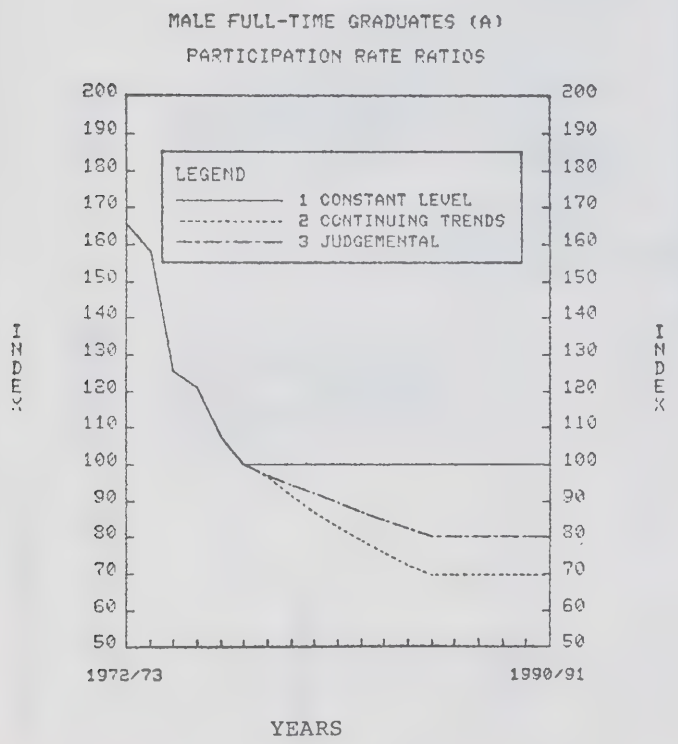
SOURCE: APPENDIX B

(A) EXCLUDES FOREIGN STUDENTS AND TRANSFER STUDENTS

3. Full-time graduate males

For this group, participation rates have fallen precipitously since the early seventies (Chart 5). Assuming continuation of constant participation rates as of 1977-78 would be unrealistic in the face of this trend. The other two scenarios differ only in degree. The continuing trends scenario assumes a decline of 30 percent in participation ratios by 1985-86. The decline for the judgemental scenario is 20 percent. In 1985-86, the three scenarios range from a high of 22,700 (constant) to a low of 15,800 (continuing). The projection results for the three scenarios are given in Table 5.

Chart 5



SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

TABLE 5

UNIVERSITY ENROLMENT TRENDS (A)
FULL-TIME GRADUATE MALES

(THOUSANDS)

		SCENARIO 1	SCENARIO 2	SCENARIO 3
		CONSTANT PART. RATES	CONTINUING TRENDS	JUDGEMENTAL
ACTUAL	1977/78	18.7	18.7	18.7
	1978/79	19.3	18.6	18.8
	1979/80	19.8	18.1	18.8
	1980/81	20.4	17.7	18.7
	1981/82	20.9	17.3	18.7
	1982/83	21.4	16.9	18.6
	1983/84	21.9	16.6	18.6
ANNUAL DATA	1984/85	22.4	16.2	18.4
	1985/86	22.7	15.8	18.2
	1986/87	23.0	16.0	18.4
	1987/88	23.2	16.2	18.6
	1988/89	23.2	16.2	18.6
	1989/90	23.1	16.1	18.5
	1990/91	22.8	15.9	18.2
FIVE-YEAR AVERAGES	1991-1995	21.9	15.2	17.5
	1996-2000	20.7	14.4	16.5

SOURCE: APPENDIX B

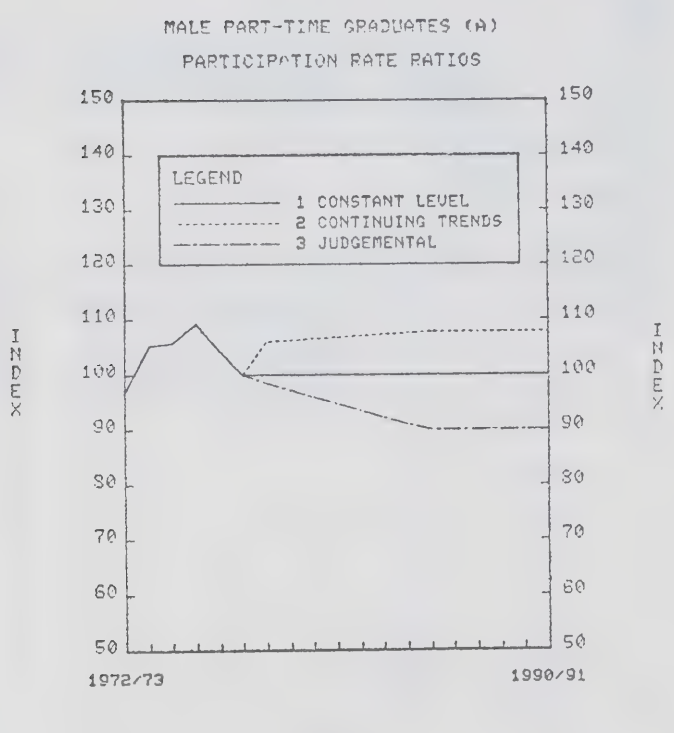
(A) INCLUDES TRANSFER STUDENTS AND EXCLUDES FOREIGN STUDENTS

4. Part-time graduate males

Until 1975-76, participation rates for this group increased strongly but have since declined. Scenario 3 (judgemental) assumes continuing decline to the mid 1980s.

The three projections range from a low of 19,700 (judgemental) to a high of 23,600 (continuing). The constant participation rate scenario projects 21,900 students in 1985-86, which is a mid-path projection. The projection results are given in Table 6.

CHART 6



SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

TABLE 6

UNIVERSITY ENROLMENT TRENDS (A)
PART-TIME GRADUATE MALES

(THOUSANDS)

		SCENARIO 1	SCENARIO 2	SCENARIO 3
		CONSTANT PART. RATES	CONTINUING TRENDS	JUDGEMENTAL
ACTUAL	1977/78	17.7	17.7	17.7
	1978/79	18.2	19.3	18.0
	1979/80	18.7	19.9	18.2
	1980/81	19.3	20.5	18.5
	1981/82	19.8	21.2	18.8
	1982/83	20.3	21.8	19.0
	1983/84	20.8	22.4	19.3
ANNUAL DATA	1984/85	21.4	23.0	19.5
	1985/86	21.9	23.6	19.7
	1986/87	22.4	24.1	20.2
	1987/88	22.8	24.6	20.5
	1988/89	23.2	25.0	20.9
	1989/90	23.5	25.3	21.2
	1990/91	23.7	25.6	21.3
FIVE-YEAR AVERAGES	1991-1995	23.8	25.6	21.4
	1996-2000	23.1	24.9	20.7

SOURCE: APPENDIX B

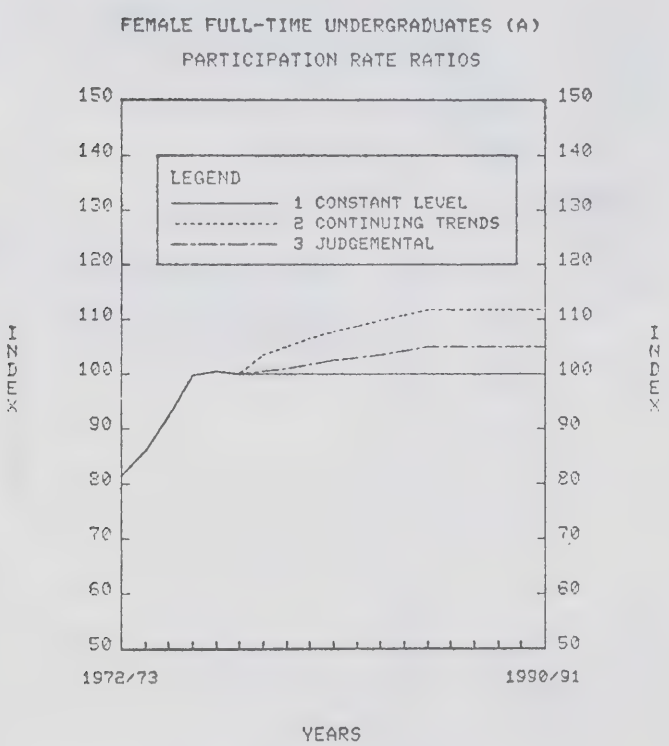
(A) EXCLUDES FOREIGN STUDENTS AND TRANSFER STUDENTS

5. Full-time undergraduate females

As shown in Chart 7, participation rate levels have increased significantly during the first half of the decade but have stabilized in the past three years. The judgemental (scenario 3) projection assumes further increases in rates, but at a decelerating pace.

Enrolment projections shown in Table 7 for the three scenarios range from a low (constant) of 144,000 to a high of 161,000 (continuing) in the year 1985-86. The judgemental projection is 151,000 in that year, which represents an increase of 7 percent over the 1977-78 level of 141,000.

Chart 7



SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

TABLE 7

UNIVERSITY ENROLMENT TRENDS (A)
FULL-TIME UNDERGRADUATE FEMALES

(THOUSANDS)

		SCENARIO 1	SCENARIO 2	SCENARIO 3
		CONSTANT PART. RATES	CONTINUING TRENDS	JUDGEMENTAL
ACTUAL	1977/78	141.1	141.1	141.1
	1978/79	143.6	148.7	144.5
	1979/80	146.2	153.7	148.0
	1980/81	148.3	157.9	151.0
	1981/82	149.6	161.3	153.4
	1982/83	150.3	163.6	154.9
	1983/84	149.7	164.5	155.2
ANNUAL DATA	1984/85	147.7	163.8	154.2
	1985/86	144.3	161.3	151.4
	1986/87	139.9	156.4	146.7
	1987/88	135.3	151.3	141.9
	1988/89	131.8	147.4	138.3
	1989/90	129.7	145.1	136.1
	1990/91	128.2	143.4	134.5
FIVE-YEAR AVERAGES	1991-1995	123.8	138.4	129.9
	1996-2000	125.8	140.6	132.0

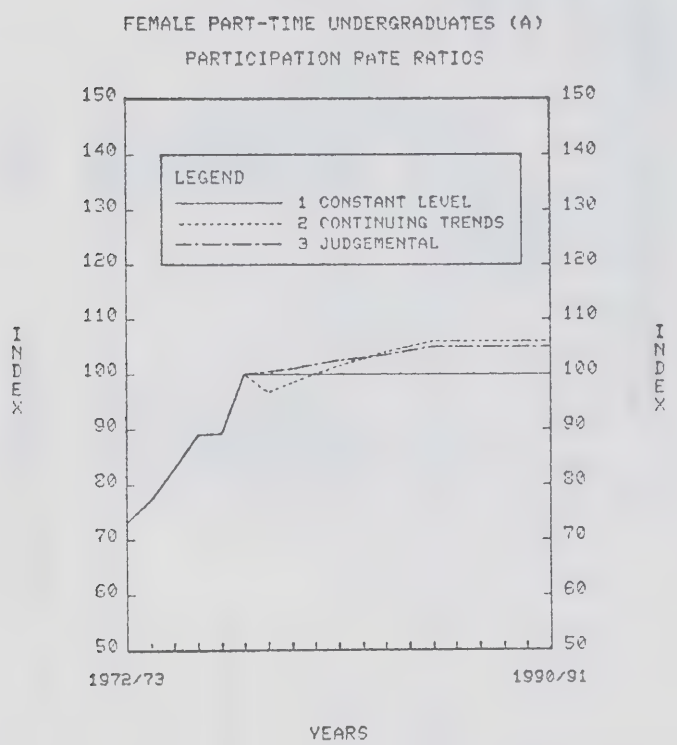
SOURCE: APPENDIX B

(A) EXCLUDES FOREIGN STUDENTS AND TRANSFER STUDENTS

6. Part-time undergraduate females

Chart 8 displays the pattern of participation rate ratios for the seventies and the projection period. Participation rates increased substantially during the seventies and further but less drastic increases are assumed under scenario 3. Scenario 3 implies 1985-86 enrolments of 130,000, an increase of 26 percent over the 1977-78 level of 103,000 (Table 8).

Chart 8



SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

TABLE 8

UNIVERSITY ENROLMENT TRENDS (A)
PART-TIME UNDERGRADUATE FEMALES

(THOUSANDS)

		SCENARIO 1	SCENARIO 2	SCENARIO 3
		CONSTANT PART. RATES	CONTINUING TRENDS	JUDGEMENTAL
ACTUAL	1977/78	102.9	102.9	102.9
ANNUAL DATA	1978/79	105.6	102.2	106.2
	1979/80	108.3	106.8	109.6
	1980/81	110.9	111.2	112.9
	1981/82	113.6	115.4	116.4
	1982/83	116.2	119.6	119.8
	1983/84	118.7	123.6	123.1
	1984/85	121.0	127.3	126.3
	1985/86	123.0	130.6	129.0
	1986/87	124.7	132.4	130.8
	1987/88	126.0	133.9	132.2
	1988/89	127.1	134.9	133.3
	1989/90	127.9	135.8	134.1
	1990/91	128.5	136.5	134.8
FIVE-YEAR AVERAGES	1991-1995	129.3	137.4	135.7
	1996-2000	128.8	136.8	135.1

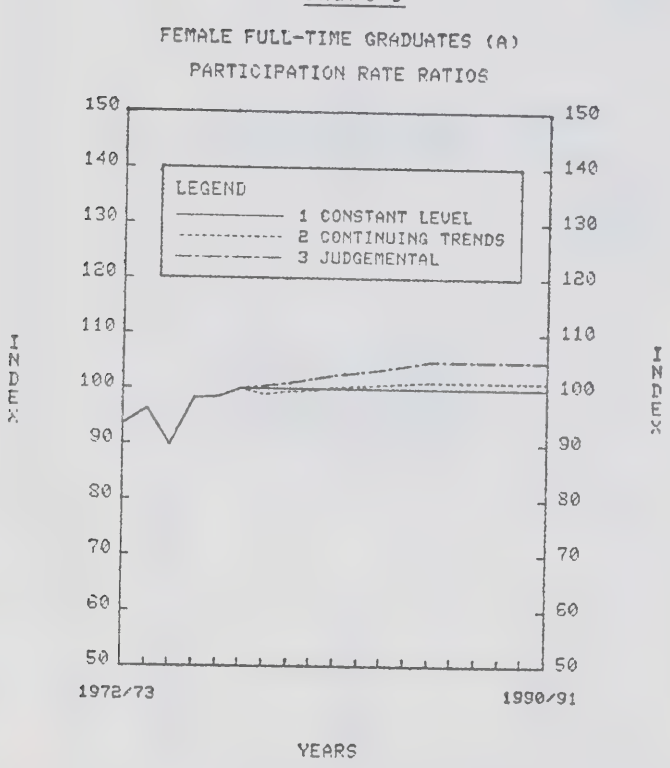
SOURCE: APPENDIX B

(A) EXCLUDES FOREIGN STUDENTS AND TRANSFER STUDENTS

7. Full-time graduate females

Participation rates for this group have fluctuated somewhat during the seventies, as shown in Chart 9. The three scenarios assume little or no change in the rates, implying 1985-86 enrolments of about 13,000, an increase of 18 percent over the base year 1977-78 of 11,000 (Table 9). The increase may turn out to be higher as the number of students qualified to enter graduate schools has been steadily rising over the years.

Chart 9



SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

TABLE 9

UNIVERSITY ENROLMENT TRENDS (A)
FULL-TIME GRADUATE FEMALES

(THOUSANDS)

		SCENARIO 1	SCENARIO 2	SCENARIO 3
		CONSTANT PART. RATES	CONTINUING TRENDS	JUDGEMENTAL
ACTUAL	1977/78	10.5	10.5	10.5
ANNUAL DATA	1978/79	10.7	10.7	10.8
	1979/80	11.0	11.0	11.2
	1980/81	11.3	11.3	11.5
	1981/82	11.5	11.6	11.8
	1982/83	11.8	11.9	12.2
	1983/84	12.0	12.1	12.5
	1984/85	12.2	12.4	12.8
	1985/86	12.4	12.6	13.0
	1986/87	12.5	12.7	13.2
	1987/88	12.6	12.8	13.2
	1988/89	12.6	12.8	13.2
	1989/90	12.5	12.7	13.1
	1990/91	12.4	12.6	13.0
FIVE-YEAR AVERAGES	1991-1995	12.1	12.2	12.7
	1996-2000	11.6	11.8	12.2

SOURCE: APPENDIX B

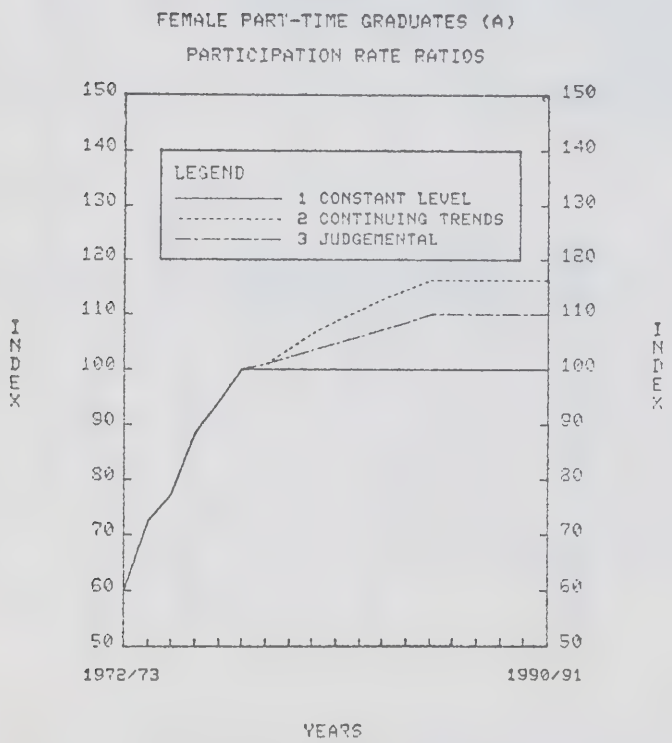
(A) EXCLUDES FOREIGN STUDENTS AND TRANSFER STUDENTS

8. Part-time graduate females

As demonstrated in Chart 10, participation rate levels increased very substantially during the seventies. With no further increase in the level of participation rates, part-time female graduate enrolments would increase by 22 percent to 11,600 in 1985-86. The continuing trends scenario anticipates enrolments of about 13,000 by 1985-86 (Table 10).

In Scenario 3 it is assumed that participation rates will continue to rise, but at a decelerating rate. It should be noted that the number of students qualified to enter graduate studies has been steadily rising.

Chart 10



SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

TABLE 10

UNIVERSITY ENROLMENT TRENDS (A)
PART-TIME GRADUATE FEMALES

(THOUSANDS)

		SCENARIO 1	SCENARIO 2	SCENARIO 3
		CONSTANT PART. RATES	CONTINUING TRENDS	JUDGEMENTAL
ACTUAL	1977/78	9.5	9.5	9.5
ANNUAL DATA	1978/79	9.8	9.9	9.9
	1979/80	10.0	10.4	10.3
	1980/81	10.3	11.0	10.7
	1981/82	10.6	11.5	11.1
	1982/83	10.8	12.0	11.5
	1983/84	11.1	12.5	11.9
	1984/85	11.3	13.0	12.3
	1985/86	11.6	13.5	12.7
	1986/87	11.8	13.7	13.0
	1987/88	12.0	13.9	13.2
	1988/89	12.1	14.1	13.4
	1989/90	12.3	14.3	13.5
	1990/91	12.3	14.3	13.6
FIVE-YEAR AVERAGES	1991-1995	12.4	14.4	13.6
	1996-2000	12.1	14.1	13.4

SOURCE: APPENDIX B

(A) EXCLUDES FOREIGN STUDENTS AND TRANSFER STUDENTS

9. Community College Transfer Enrolment

Participation rates for males were relatively stable during the seventies, while female participation rates increased significantly, (see Appendix Table A-1). Since enrolments in the transfer program are concentrated in the 18-24 age-group (see Chart C-1) all three scenarios are influenced significantly by the projected declines in the size of this age-group following 1982-83.

Under scenario 3, the participation rates for male and female transfer students are assumed to rise to the mid-eighties. While there is no evidence available at present to defend this or any other assumption, there might be a suspicion that at least the male rates could decline instead of rise. This would be the case if it could be shown that for a substantial proportion of students the community colleges provide a way of engaging in university study after being unable to enter a university. If that proportion is large enough, then in a period when university enrolment is expected to fall, the enrolment at community colleges might fall even faster.

As shown in Table 11, the three enrolment scenarios indicate 1985-86 total transfer student enrolments in the range of 75,000 (constant) to 85,000 (judgemental). The continuing trends scenario falls mid-way in this range at 81,000 students, down slightly from the 1977-78 level of 83,000.

TOTAL UNIVERSITY-LEVEL ENROLMENT

Total university-level enrolment (excluding enrolment of foreign students) is obtained by combining the various full-time categories with the part-time categories on a full-time equivalent (FTE)[6] basis. Assuming constant participation rates for the projection period (scenario 1), FTE enrolment would rise to 506,000 in 1985-86, from 482,000 in 1976-77. The level would rise over the interval to 520,000 by 1982-83, and then decline. The implied growth over the eight-year period to 1985-86 is 5 percent under this scenario, compared with 3.7 percent for the 18-24 population. The contribution of the age-groups above 24 is reflected by this difference.

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[6] Combined on the basis of 3.75 undergraduate part-time = 1 full-time and 2.5 graduate part-time = 1 full-time.

TABLE 11

COMMUNITY COLLEGE ENROLMENT
FULL-TIME TRANSFER STUDENTS (A)

(THOUSANDS)

		SCENARIO 1			SCENARIO 2			SCENARIO 3		
		MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL
ACTUAL	1977/78	44.7	37.8	82.5	44.7	37.8	82.5	44.7	37.8	82.5
	1978/79	45.7	38.5	84.2	44.1	37.3	81.4	44.9	38.5	83.4
	1979/80	46.2	38.8	85.0	45.2	38.6	83.8	46.3	39.8	86.1
	1980/81	46.2	38.8	85.0	45.7	39.6	85.4	47.0	40.9	87.9
	1981/82	46.0	38.7	84.7	45.8	40.2	86.0	47.3	41.6	89.0
	1982/83	45.5	38.2	83.6	45.7	40.5	86.2	47.4	42.2	89.6
	1983/84	44.2	37.1	81.3	45.1	40.5	85.6	47.1	42.4	89.5
ANNUAL DATA	1984/85	42.4	35.6	78.0	43.9	39.7	83.6	46.1	41.9	88.0
	1985/86	40.5	34.1	74.6	42.2	38.5	80.7	44.5	40.9	85.4
	1986/87	39.0	32.9	71.9	40.3	36.9	77.1	42.5	39.1	81.7
	1987/88	38.2	32.4	70.7	38.8	35.6	74.4	40.9	37.8	78.8
	1988/89	38.1	32.4	70.5	38.0	35.1	73.1	40.1	37.3	77.4
	1989/90	37.8	32.2	70.0	37.9	35.1	73.0	40.0	37.3	77.3
	1990/91	37.1	31.5	68.7	37.6	34.8	72.4	39.7	37.0	76.7
FIVE-YEAR AVERAGES	1991-1995	36.4	31.1	67.5	36.2	33.6	69.8	38.2	35.7	73.9
	1996-2000	38.4	32.9	71.3	37.7	35.1	72.8	39.8	37.3	77.1

SOURCE: APPENDEX B

(A) UNIVERSITY-LEVEL

The continuing trends projection is parallel to scenario 1, but at a higher level.

The most interesting scenario is the judgemental which combines different participation rate assumptions for each of the individual categories. In this scenario, the implied level of enrolment rises to 505,000 by 1982-83 and then declines to 486,000 by 1985-86. Under this scenario the lowest increase in enrolments is recorded (1 percent by 1985-86 compared with 5 percent and 9 percent constant and continuing trends respectively.

To achieve this result would require some rather substantial, if not unprecedented, declines in male participation rates, especially for full-time undergraduates and graduates whose rates would need to decline by almost 20 percent. Also, it would require no further substantial increases in the female rates. This finding underlines the relative demographic pressures that can still be expected to affect enrolment trends over the years to 1985-86, and the fact that reliance on the trend in the traditional 18-24 age population for projection purposes would underestimate enrolment.

Another factor that would help maintain the level of enrolment in the face of demographic declines is the limited supply of places in some program areas. A reduced age cohort may merely result in a decline in the number of applicants rather than in a decline in enrolments.

Participation rates are held constant for the years following 1985-86. Thus the three projections give similar patterns of enrolment change after 1985-86. The judgemental projection falls steadily from a peak of 505,000 in 1982-83, to a trough of 429,000 in 1995-96 and then rises to 442,000 by 2000-01. The continuing trends scenario follows the same trend, but at a level 8 percent higher. Similarly, the constant participation rate scenario traces the same pattern as the judgemental, but at a level 4 percent higher.

Table 12 summarizes the projections of total enrolment by scenario with further details provided in Appendix B.

TABLE 12

UNIVERSITY ENROLMENT TRENDS (A)
TOTAL UNIVERSITY-LEVEL ENROLMENTS (FTE)

(THOUSANDS)

		SCENARIO 1	SCENARIO 2	SCENARIO 3
		CONSTANT PART. RATES	CONTINUING TRENDS	JUDGEMENTAL
ACTUAL	1977/78	481.6	481.6	481.6
ANNUAL DATA	1978/79	492.7	498.3	487.6
	1979/80	502.6	511.2	495.3
	1980/81	510.6	522.1	500.8
	1981/82	516.4	530.0	504.0
	1982/83	519.7	535.6	505.1
	1983/84	519.1	537.5	502.9
	1984/85	514.4	535.1	496.8
	1985/86	505.9	526.8	485.9
	1986/87	495.6	515.0	475.2
	1987/88	485.4	502.8	464.2
	1988/89	477.7	493.6	456.1
	1989/90	471.9	487.9	451.2
	1990/91	466.3	483.0	446.9
FIVE-YEAR AVERAGES	1991-1995	453.1	468.2	433.4
	1996-2000	456.1	470.9	436.1

SOURCE: APPENDIX B

(A) INCLUDES TRANSFER STUDENTS AND EXCLUDES FOREIGN STUDENTS

The composition of university-level enrolment at selected points in time is shown in Table 13. Female enrolment represented 39 percent of the total in 1972-73 and by 1977-78 this proportion had increased to 46 percent. The judgemental projection indicates a further increase in female enrolment to some 50 percent of the total by 1985-86, a share that does not change significantly over the period to the year 2000.

TABLE 13

COMPOSITION OF UNIVERSITY LEVEL ENROLMENT (A)
(SELECTED YEARS)

		PERCENT DISTRIBUTION (B)				
		1972-73	1977-78	1985-86	1990-91	2000-01
MALE	COMMUNITY COLLEGE TRANSFER	9	9	9	9	9
	FULL-TIME UNDERGRADUATE	40	35	30	29	28
	PART-TIME UNDERGRADUATE	4	4	5	6	6
	FULL-TIME GRADUATE	7	4	4	4	4
	PART-TIME GRADUATE	1	2	2	2	2
	TOTAL MALE	61	54	50	50	49
FEMALE	COMMUNITY COLLEGE TRANSFER	6	8	8	8	9
	FULL-TIME UNDERGRADUATE	26	29	31	30	30
	PART-TIME UNDERGRADUATE	4	6	7	8	8
	FULL-TIME GRADUATE	2	2	3	3	3
	PART-TIME GRADUATE	1	1	1	1	1
	TOTAL FEMALE	39	46	50	50	51
	TOTAL BOTH SEXES	100	100	100	100	100

SOURCE: TABLE 2 AND APPENDIX TABLE B-1

(A) SCENARIO 3, (JUDGEMENTAL PROJECTION); EXCLUDES FOREIGN STUDENTS

(B) BASED ON FTE ENROLMENTS

COMPARISON BETWEEN ACTUAL AND PROJECTED VALUES

The base year for these enrolment projections was 1977-78. Preliminary estimates from Statistics Canada allow a comparison between the actual and projected values for the years 1978-79 and 1979-80. These comparisons are shown in Table 14. Using Scenario III, actual full-time undergraduate and graduate enrolment is about 2 percent lower than projected for 1979-80. This would imply that participation rates are falling at a slightly faster rate than assumed. In contrast, actual part-time undergraduate enrolments are above the projection for 1979-80, implying that participation rates are growing at a slightly faster rate than anticipated. Projected part-time graduate enrolments seem to be on target.

TABLE 14

COMPARISON OF ACTUAL VS PROJECTED ENROLMENTS

FOR 1978-79 AND 1979-80

YEAR	SCENARIO I (CONSTANT)				SCENARIO II (CONTINUING)				SCENARIO III (JUDGEMENTAL)			
	UNDERGRADUATE		GRADUATE		UNDERGRADUATE		GRADUATE		UNDERGRADUATE		GRADUATE	
	F.T.	P.T.	F.T.	P.T.	F.T.	P.T.	F.T.	P.T.	F.T.	P.T.	F.T.	P.T.
1978-79												
Projected	337.2	184.3	37.4	29.4	347.3	179.0	36.7	30.6	333.2	185.4	37.0	29.3
Actual*	323.6	184.5	36.6	29.7	323.6	184.5	36.6	29.7	323.6	184.5	36.6	29.7
% Diff.	-4.0	+0.1	-2.1	+1.0	-6.8	+3.1	-0.3	-2.9	-2.9	-0.5	-1.1	+1.4
1979-80												
Projected	344.0	189.0	38.3	30.2	355.7	186.2	36.5	31.7	336.0	191.2	37.3	29.9
Actual*	328.3	195.7	36.5	29.9	328.3	195.7	36.5	29.9	328.3	195.7	36.5	29.9
% Diff.	-4.6	+3.5	-4.7	-1.0	-7.7	+5.1	0.0	-5.7	-2.3	+2.4	-2.2	0.0

SOURCE: Based on data provided by Statistics Canada, Education, Science and Culture Division.

* Includes foreign students at same level as 1977-78 for each program.

APPENDIX A

INDICES OF PARTICIPATION RATES

APPENDIX TABLE A-1

RATIO OF PART. RATES TO BASE YEAR (A)(B)
1972/73 TO 1977/78

	COMMUNITY COLLEGE (FULL-TIME)				UNIVERSITY (UNDERGRADUATE)				UNIVERSITY (GRADUATE)			
	MALE TRANSFER	FEMALE TRANSFER	MALE CAREER	FEMALE CAREER	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME
1972/73	98.4	83.7	102.6	73.7	108.4	81.6	90.9	73.4	165.8	93.6	97.2	60.1
1973/74	103.3	89.1	104.2	91.8	107.8	86.1	86.6	77.5	158.3	96.4	105.5	72.7
1974/75	100.0	100.0	100.0	100.0	106.8	92.5	88.7	82.9	125.7	90.0	105.9	77.4
1975/76	98.6	103.1	106.1	101.4	107.1	99.9	96.1	89.1	121.1	98.5	109.4	88.5
1976/77	100.6	103.9	106.5	105.0	105.0	100.6	95.4	89.4	107.5	98.6	104.4	94.4
1977/78	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students, See Appendix Table B-5.

(B) Due to some non-response the division between males and females was estimated.

APPENDIX TABLE A-2

RATIO OF PART RATES TO BASE YEAR (A)
SCENARIO 1: CONSTANT PARTICIPATION RATES

		COMMUNITY COLLEGE (FULL-TIME)				UNIVERSITY (UNDERGRADUATE)				UNIVERSITY (GRADUATE)			
		MALE TRANSFER	FEMALE TRANSFER	MALE CAREER	FEMALE CAREER	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME
ACTUAL	1977/78	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
ANNUAL DATA	1978/79	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1979/80	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1980/81	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1981/82	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1982/83	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1983/84	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1984/85	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1985/86	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
FIVE-YEAR AVERAGES	1986 - 1990	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1991 - 1995	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	1996 - 2000	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students, See Appendix Table B-5.

APPENDIX TABLE A-3

RATIO OF PART RATES TO BASE YEAR (A)
SCENARIO 2: CONTINUING TRENDS IN PART. RATES

		COMMUNITY COLLEGE (FULL-TIME)				UNIVERSITY (UNDERGRADUATE)				UNIVERSITY (GRADUATE)			
		MALE TRANSFER	FEMALE TRANSFER	MALE CAREER	FEMALE CAREER	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME
ACTUAL	1977/78	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
ANNUAL DATA	1978/79	101.5	112.6	106.5	113.5	102.9	103.5	97.5	96.8	96.6	99.1	106.0	101.0
	1979/80	101.6	114.7	106.8	116.1	102.4	105.1	98.3	98.6	91.4	99.5	106.3	103.9
	1980/81	101.8	116.6	107.1	118.3	102.0	106.5	98.9	100.2	86.8	99.9	106.7	106.5
	1981/82	101.9	118.2	107.4	120.4	101.6	107.8	99.5	101.6	82.7	100.3	106.9	108.8
	1982/83	102.0	119.8	107.6	122.2	101.3	108.9	100.0	102.9	79.0	100.6	107.2	110.9
	1983/84	102.1	121.2	107.8	123.9	101.0	109.9	100.5	104.1	75.6	100.9	107.4	112.9
	1984/85	102.1	122.4	108.0	125.4	101.0	110.9	100.9	105.2	72.4	101.2	107.6	114.6
	1985/86	102.2	123.6	108.2	126.9	100.4	111.8	101.3	106.2	69.6	101.4	107.8	116.3
FIVE-YEAR AVERAGES	1986 - 1990	102.2	123.6	108.2	126.9	100.4	111.8	101.3	106.2	69.6	101.4	107.8	116.3
	1991 - 1995	102.2	123.6	108.2	126.9	100.4	111.8	101.3	106.2	69.6	101.4	107.8	116.3
	1996 - 2000	102.2	123.6	108.2	126.9	100.4	111.8	101.3	106.2	69.6	101.4	107.8	116.3

SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

APPENDIX TABLE A-4

RATIO OF PART RATES TO BASE YEAR (A)
SCENARIO 3: JUDGEMENTAL PART. RATE PROJECTION

		COMMUNITY COLLEGE (FULL-TIME)				UNIVERSITY (UNDERGRADUATE)				UNIVERSITY (GRADUATE)			
		MALE TRANSFER	FEMALE TRANSFER	MALE CAREER	FEMALE CAREER	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME
ACTUAL	1977/78	102.8	114.2	107.2	110.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
ANNUAL DATA	1978/79	103.4	116.2	107.8	111.9	97.2	100.6	100.6	100.6	97.2	100.6	98.7	101.2
	1979/80	104.1	118.3	108.4	113.3	94.6	101.2	101.2	101.2	94.6	101.2	97.4	102.3
	1980/81	104.7	120.3	109.1	114.6	92.0	101.8	101.8	101.8	92.0	101.8	96.1	103.6
	1981/82	105.3	122.5	109.8	116.0	89.4	102.5	102.5	102.5	89.4	102.5	94.9	104.9
	1982/83	106.0	124.6	110.4	117.4	87.0	103.1	103.1	103.1	87.0	103.1	93.6	106.1
	1983/84	106.6	126.8	111.1	118.8	84.6	103.7	103.7	103.7	84.6	103.7	92.4	107.4
	1984/85	107.2	129.1	111.8	120.3	82.3	104.4	104.4	104.4	82.3	104.4	91.2	108.7
	1985/86	107.9	131.3	112.5	121.7	80.0	105.0	105.0	105.0	80.0	105.0	90.0	110.0
FIVE-YEAR AVERAGES	1986 - 1990	107.9	131.3	112.5	121.7	80.0	105.0	105.0	105.0	80.0	105.0	90.0	110.0
	1991 - 1995	107.9	131.3	112.5	121.7	80.0	105.0	105.0	105.0	80.0	105.0	90.0	110.0
	1996 - 2000	107.9	131.3	112.5	121.7	80.0	105.0	105.0	105.0	80.0	105.0	90.0	110.0

SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.
(A) Excludes foreign students.

APPENDIX B

DETAILS OF POST-SECONDARY ENROLMENT

APPENDIX TABLE B-1

POST-SECONDARY ENROLMENT (A)(B)
1972/73 TO 1977/78

	COMMUNITY COLLEGE (FULL-TIME)				UNIVERSITY (UNDERGRADUATE)				UNIVERSITY (GRADUATE)			
	MALE TRANSFER	FEMALE TRANSFER	MALE CAREER	FEMALE CAREER	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME
1972/73	38,286	24,933	62,931	47,089	163,583	103,020	58,125	65,358	26,446	8,459	14,601	4,923
1973/74	41,323	27,200	65,810	60,011	167,877	111,075	57,128	70,940	26,141	8,984	16,340	6,139
1974/75	41,102	31,285	65,023	66,945	171,464	122,050	60,372	78,079	21,584	8,666	16,917	6,721
1975/76	41,499	32,977	70,895	69,501	176,950	134,963	67,518	86,179	21,486	9,746	18,017	7,901
1976/77	42,722	33,797	71,662	73,497	174,430	139,297	69,132	89,598	19,585	10,021	17,968	8,738
1977/78	44,679	37,798	73,909	78,755	170,644	141,052	74,557	102,887	18,740	10,454	17,710	9,512

SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students, See Appendix Table B-5.

(B) Due to some non-response the division between males and females was estimated.

APPENDIX TABLE B-2

PROJECTION OF POST-SECONDARY ENROLMENT (A)
SCENARIO 1: CONSTANT PARTICIPATION RATES

		COMMUNITY COLLEGE (FULL-TIME)				UNIVERSITY (UNDERGRADUATE)				UNIVERSITY (GRADUATE)			
		MALE TRANSFER	FEMALE TRANSFER	MALE CAREER	FEMALE CAREER	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME
ACTUAL	1977/78	44,679	37,798	73,909	78,755	170,645	141,054	74,557	102,887	18,739	10,455	17,712	9,510
ANNUAL DATA	1978/79	45,699	38,483	75,742	80,300	174,980	143,638	76,674	105,611	19,289	10,749	18,230	9,781
	1979/80	46,191	38,816	77,329	81,636	179,150	146,201	78,739	108,266	19,834	11,020	18,722	10,038
	1980/81	46,212	38,822	78,269	82,253	182,639	148,289	80,789	110,945	20,362	11,279	19,251	10,299
	1981/82	46,010	38,660	78,770	82,462	185,104	149,649	82,812	113,600	20,881	11,531	19,787	10,558
	1982/83	45,451	38,157	78,788	82,060	186,563	150,253	84,788	116,241	21,407	11,785	20,314	10,818
	1983/84	44,209	37,063	78,037	80,893	186,690	149,686	86,655	118,711	21,925	12,026	20,844	11,071
	1984/85	42,436	35,583	76,406	78,669	185,125	147,731	88,334	120,963	22,379	12,237	21,376	11,327
	1985/86	40,519	34,062	74,113	75,871	181,768	144,303	89,780	122,990	22,748	12,413	21,899	11,568
FIVE-YEAR AVERAGES	1986 - 1990	38,053	32,309	68,569	70,918	167,957	133,000	92,002	126,837	23,069	12,537	23,126	12,104
	1991 - 1995	36,379	31,102	64,266	67,831	154,355	123,820	91,844	129,338	21,906	12,072	23,782	12,351
	1996 - 2000	38,390	32,861	65,928	70,736	154,426	125,794	89,518	128,793	20,657	11,633	23,052	12,141

SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

APPENDIX TABLE B-3

PROJECTION OF POST-SECONDARY ENROLMENT (A)
SCENARIO 2: CONTINUING TRENDS IN PART. RATES

		COMMUNITY COLLEGE (FULL-TIME)				UNIVERSITY (UNDERGRADUATE)				UNIVERSITY (GRADUATE)			
		MALE TRANSFER	FEMALE TRANSFER	MALE CAREER	FEMALE CAREER	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME
ACTUAL	1977/78	44,679	37,798	73,909	78,755	170,645	141,054	74,557	102,887	18,739	10,455	17,712	9,510
ANNUAL DATA	1978/79	44,121	37,268	73,472	80,826	180,054	148,666	74,757	102,231	18,633	10,652	19,324	9,879
	1979/80	45,167	38,636	75,474	84,247	183,450	153,658	77,400	106,750	18,128	10,965	19,902	10,430
	1980/81	45,743	39,615	77,272	87,272	186,292	157,927	79,900	111,166	17,674	11,268	20,541	10,968
	1981/82	45,808	40,166	78,430	89,492	188,066	161,322	82,398	115,418	17,269	11,566	21,152	11,488
	1982/83	45,653	40,540	79,080	91,062	188,988	163,625	84,788	119,612	16,912	11,856	21,777	11,998
	1983/84	45,143	40,479	79,245	91,878	188,557	164,505	87,088	123,578	16,576	12,134	22,387	12,499
	1984/85	43,909	39,709	78,634	91,668	186,976	163,834	89,129	127,253	16,202	12,384	23,000	12,981
	1985/86	42,189	38,497	77,134	90,214	182,495	161,330	90,947	130,616	15,833	12,587	23,607	13,454
FIVE-YEAR AVERAGES	1986 - 1990	38,502	35,499	70,768	82,778	168,629	148,694	93,198	134,701	16,056	12,712	24,929	14,078
	1991 - 1995	36,211	33,617	65,383	78,055	154,972	138,431	93,038	137,358	15,247	12,241	25,637	14,365
	1996 - 2000	37,698	35,146	65,882	80,265	155,043	140,638	90,682	136,778	14,377	11,796	24,850	14,120

SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

APPENDIX TABLE B-4

PROJECTION OF POST-SECONDARY ENROLMENT (A)
SCENARIO 3: JUDGEMENTAL PART. RATE PROJECTION

		COMMUNITY COLLEGE (FULL-TIME)				UNIVERSITY (UNDERGRADUATE)				UNIVERSITY (GRADUATE)			
		MALE TRANSFER	FEMALE TRANSFER	MALE CAREER	FEMALE CAREER	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME
ACTUAL	1977/78	44,679	37,798	73,909	78,755	170,645	141,054	74,557	102,887	18,739	10,455	17,712	9,510
ANNUAL DATA	1978/79	44,947	38,460	74,369	79,687	170,079	144,500	77,134	106,245	18,750	10,813	17,991	9,901
	1979/80	46,278	39,849	76,605	82,215	169,475	147,956	79,684	109,565	18,764	11,152	18,233	10,271
	1980/81	47,046	40,873	78,715	84,543	168,027	150,958	82,243	112,942	18,734	11,482	18,498	10,672
	1981/82	47,337	41,627	80,183	86,222	165,482	153,390	84,882	116,440	18,669	11,820	18,775	11,078
	1982/83	47,443	42,164	81,137	87,485	162,309	154,911	87,417	119,844	18,625	12,150	19,012	11,481
	1983/84	47,132	42,350	81,670	88,096	157,939	155,225	89,861	123,104	18,550	12,471	19,258	11,893
	1984/85	46,102	41,882	81,401	87,939	152,357	154,232	92,221	126,285	18,419	12,776	19,492	12,315
	1985/86	44,542	40,895	80,199	86,518	145,414	151,374	94,179	129,017	18,199	13,021	19,707	12,728
FIVE-YEAR AVERAGES	1986 - 1990	40,650	37,710	73,580	79,385	134,365	139,517	96,512	133,052	18,456	13,151	20,811	13,318
	1991 - 1995	38,231	35,712	67,982	74,857	123,482	129,888	96,347	135,676	17,526	12,664	21,402	13,590
	1996 - 2000	39,800	37,336	68,501	76,976	123,539	131,958	93,907	135,104	16,528	12,203	20,745	13,359

SOURCE: Based on Statistics Canada, "Universities: Enrolment and Degrees", Cat. No. 81-204, Annuals, 1972-73 to 1977-78, Education, Science and Culture Division, Ottawa.

(A) Excludes foreign students.

APPENDIX TABLE B-5

FOREIGN STUDENT ENROLMENT AT CANADAIAN UNIVERSITIES (A)(B)
1972/73 TO 1977/78

	UNIVERSITY (UNDERGRADUATE)				UNIVERSITY (GRADUATE)				TOTAL
	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME	MALE FULL-TIME	FEMALE FULL-TIME	MALE PART-TIME	FEMALE PART-TIME	
1972/73 (C)	4,981	2,567	1,026	1,451	1,995	611	663	297	13,591 (C)
1973/74	5,811	3,755	890	1,440	1,468	558	738	291	14,951
1974/75	7,044	4,671	765	1,135	2,641	954	555	270	18,035
1975/76	10,003	5,299	1,499	1,657	3,736	999	636	175	24,004
1976/77	12,186	6,774	1,060	1,459	5,479	1,498	707	273	29,436
1977/78	12,345	6,296	1,060	912	5,690	1,668	953	458	29,382

SOURCE: Based on tabulations provided by Statistics Canada, Education, Science and Culture Division.

(A) Total visas issued to foreign students for university study.

(B) Distribution by sex and program based on Statistics Canada file data by academic year.

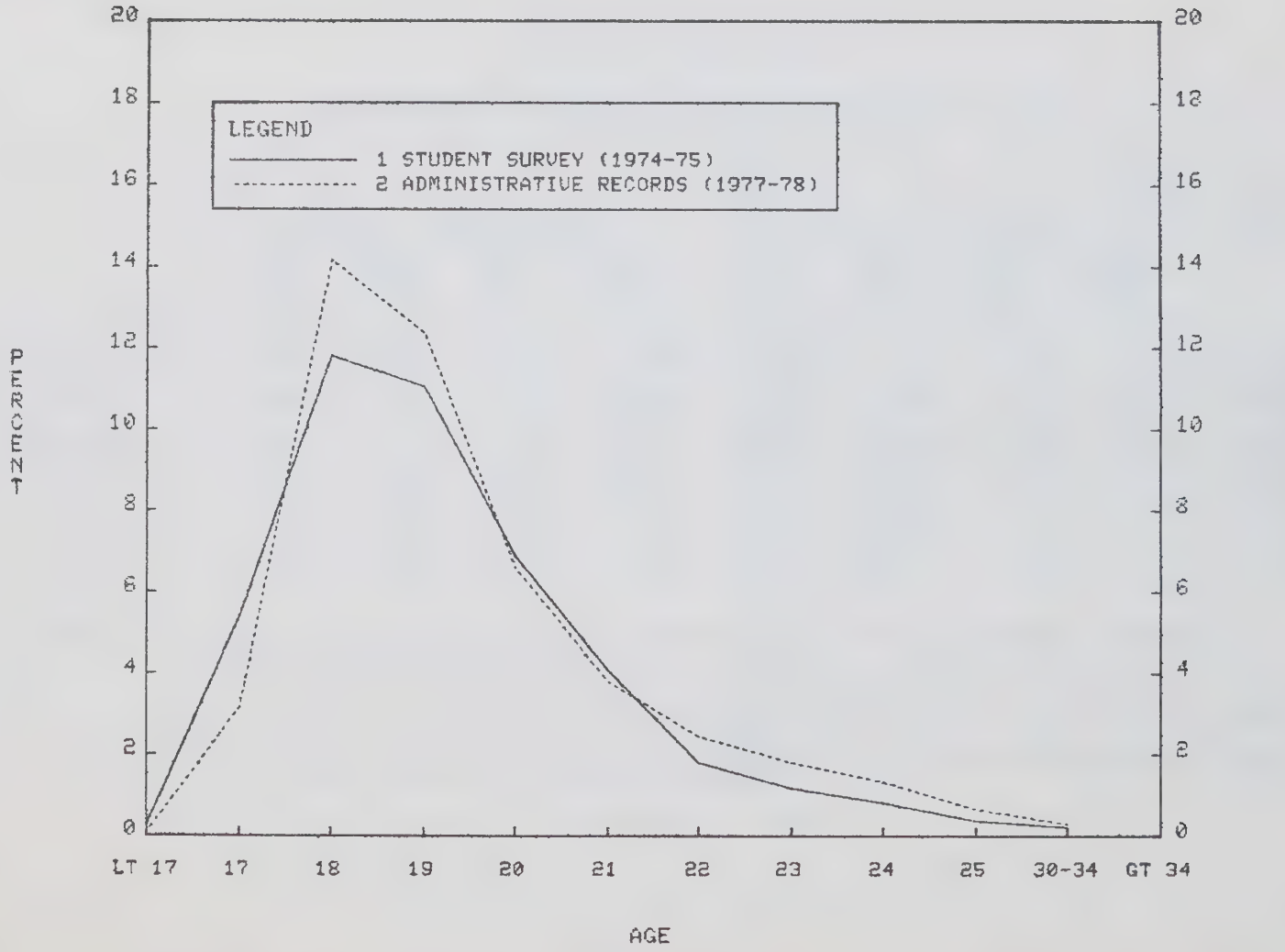
(C) 1972/73 total estimated by MOSST.

APPENDIX C

COMMUNITY COLLEGE PARTICIPATION RATES

CHART C-1

COMPARISON OF TOTAL COMMUNITY COLLEGE PARTICIPATON RATES



SOURCE: Based on data from the 1974-75 Post-Secondary Student Survey conducted by Statistics Canada and special tabulations provided by the Education, Science and Culture Division, Statistics Canada.

APPENDIX D

ALGEBRAIC FORMULATION OF THE PROJECTION PROCEDURE

ALGEBRAIC FORMULATION OF THE PROJECTION PROCEDURE

Total enrolment in each category[1] is the sum over all ages of enrolment by age:

$$E_t = \sum E_{it} \qquad (1)$$

where E_t is the enrolment in the category at time t

and E_{it} is the enrolment in the program of the ith age group

The E_{it} are defined as follows:

$$E_{it} = r_{it}\, p_{it} \qquad (2)$$

where E_{it} is the participation rate of the ith age group in the category at time t

and P_{it} is the population of the ith age group at time t

The general assumption is made that:

$$r_{it} = k_t\, r_i \qquad (3)$$

where k_t is the general participation ratio for the category at time t

and r_i is the participation rate of the ith age group in the category during the base year.

Substituting (2) and (3) into (1):

$$E_t = k_t \sum r_i\, p_t \qquad (4)$$

which is the algebraic formulation of the projection procedure for the total number of students of a particular enrolment category.

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[1] The university and college enrolment categories are listed above, pgs. 14-31.

APPENDIX E

DATA SOURCES

Data Sources

Historical data concerning university enrolment are based on Statistics Canada publications (Catalogue No. 81-204, except for the year 1976-77 which is from a manuscript version of a forthcoming publication, and the year 1977-78 which is from special tabulations by the Education Science and Culture Division). Data concerning community college enrolment for the years 1972-73 and 1973-74 are from Statistics Canada, Catalogue No. 81-229, while data for the years 1974-75, 1975-76, 1976-77 are from special tabulations prepared by the Education Science and Culture Division. Age, sex and program specific data on community college students are from the 1974-75 Post-Secondary Student Survey conducted by Statistics Canada.

Population projections are based on Population Projection C. For projections of community college enrolment, the age-groups used were single-year-of-age from 15 to 50. For university enrolment, the age-group used was 17-60 (with the "under 18" group assumed to be all 17, and the over 40 groups combined into five year spans).

APPENDIX F

TECHNICAL NOTES

I - Methods used in other recent projections

II - Macro vs provincial approach

III - Methodology used to calculate participation rate indices

I. Methods used in other recent projections

An interesting projection method has been developed by the Education Science and Culture Division of Statistics Canada. A recent study[1] has been published that uses this method, and a recent set of projections[2] is presumably based on the same method. Before elaborating on the method, it should be noted that the projections were used for the purpose of deriving estimates of school leavers and potential labour market entrants, and did not include part-time enrolment.

The hypothesis in this particular method is that it should be possible to trace a particular age cohort, say the six-year-old population, throughout its entire schooling by using estimates for retention (from one grade to the next), repeaters of grades, over-aged and under-aged, deaths, immigration, and other factors likely to intervene when a new school year starts[3]. This method has been successful in predicting enrolment, especially at the elementary and secondary levels, and in the short-term. To use this method for long-term university level enrolment projections, the following steps are necessary:

1. A pool of potential entrants to university from secondary school is calculated as the result of the elementary-secondary projection process.

2. The number of people in this pool is then multiplied by a percentage factor to get full-time undergraduate first-year university students whose last previous activity was secondary school student.

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[1] Zsigmond, Z., G. Picot, M.S. Devereaux, W. Clark, "Future Trends in Enrolment and Manpower Supply in Ontario", Statistics Canada, April 1977.

[2] Zsigmond, Z., G. Picot, W. Clark, M.S. Devereaux, "Out of School - Into the Labour Force", Statistics Canada, June 1978.

[3] Ideally these retention rates should be estimated using longitudinal data. However, only time series of cross-sectional data are available and, therefore, quasi-longitudinal methods must be used.

3. This number is then divided by the percent of full-time undergraduate first-year university students whose last previous activity was secondary student. The result is total full-time first-year university enrolment from all sources (e.g. foreign students, people returning from the labour force, etc.). It should be noted that, in the actual calculation precedure, steps 2 and 3 are combined.

4. First year enrolment (full-time) at time (t-1) is multiplied by a percentage factor (transition ratio) to obtain second year enrolment at time t. The rest of the full-time undergraduate enrolment (3rd, 4th and 5th year) is obtained similarly.

5. Full-time master's level enrolment is a percentage of a two-year moving average of third, fourth and fifth year full-time undergraduate enrolment.

6. Ph.D. full-time enrolment is a percentage of a two-year moving average of full-time master's level enrolment.

7. These calculations are by sex and province.

In this methodology, assumptions have to be made about quite a large number of ratios and relationships. When close to 100 percent of the age group is attending school, as is the case for elementary and most secondary enrolment groups, the assumptions introduce relatively little potential for variation. At the university level, however, participation rates are much less than 100 percent and extend up to age 60 or over. In the Statistics Canada method, therefore, there are several sources that might introduce variability at that level of schooling:

- the pool of potential new entrants from secondary school may vary according to the parameters used in the elementary-secondary projection submodel;

- the percent of people in the secondary school pool who go on to full-time university education is an assumption as is the percent of first-year enrolment coming directly from secondary schools;

- the transition ratios may vary according to assumption, as do the percentage factors applied to the two-year moving average of third, fourth and fifth year full-time undergraduate enrolment to obtain full-time master's enrolment and to the two-year moving average of master's enrolment to get Ph.D. enrolment; and

- while the whole model is supposed to be based on demographic projections, except for the immigration assumption, no demographic assumption can affect the university level enrolment projections to 1985-86.

This method acknowledges that there is more than one way of entering the university system, but taking this into account is a complex procedure. The calculations are based on the size of the model age group, and the propensities of people older than this group to return to university are not explicitly taken into account.

The best example of this is the step where the number of first-year students from sources other than secondary schools (the source of the great majority of older students) is implicitly calculated. This number is a function of the number of first-year students who come directly from secondary schools, all other things being equal. The same reasoning applies to the transition ratios in the next steps, relating to the following grades, and the percentage factor used for calculating graduate enrolment.

The Statistics Canada model derives a national projection by adding together estimates for the various provinces. The pros and cons of such an approach are discussed in the following section of the Appendix.

II. Macro vs provincial approach

It is conceptually possible to derive national projections either on a "macro" basis, or by building them up through provincial projections. The latter is complicated by the need for an additional set of assumptions regarding interprovincial migration and the effect of foreign migration (in the population as well as in the school enrolments). The advantage of the national approach is that the interprovincial migration flows net out to zero by definition, thereby avoiding an additional source of possible error. The advantage of the provincial approach is that provincial peculiarities and institutional differences can be taken explicitly into account. The quality of a provincial projection depends ultimately, however, on the confidence one has in the underlying population and migration estimates.

This is quite distinct from the question regarding the usefulness of provincial vs macro projections. Obviously, individual universities, and provincial education departments, prefer projections that are specific to their area of jurisdiction. Provincial projections are possible either by direct process, or by estimating the share-trend within a national projection. Which of the two is to be preferred by a province appears to be an empirical matter.

III. Methodology used to calculate participation rate indices

Traditionally, participation rates are defined as the ratio of enrolment to population, for a given aggregate, such as total full-time undergraduate enrolment as a percentage of the 18-21 population. Published data also provide such aggregate rates by sex.

However, such synthetic rates mask two factors that could offset the movement in aggregate participation rates:

- the actual university enrolment consists not only of persons in a specified age group such as 18-21, or 18-24, but contains some younger, and certainly many older persons. Further, the proportions of these under and over-aged persons are not always constant over time; and

- the under and over-aged proportions vary significantly from one category of enrolment to the next, and also by sex. For example, distribution by single-years-of-age for undergraduate full-time male students is significantly different from that of part-time graduate females, etc.

In computing participation rates, therefore, it is necessary to remove the distorting effects of changes in the various age distributions. The approach proposed here is to express participation changes in terms of rates for single-year-age-groups within each category of enrolment; and in terms of indices for aggregate categories of enrolment. (The categories of enrolment are undergraduate full-time male, graduate part-time female, etc.) The indices proposed here express the changes over time in the participation behaviour of a particular enrolment category net of any age shift effects.

In algebraic form, for a given male or female enrolment category, the aggregate participation rate index is defined as:

$$I_t = \left[\frac{\sum_i \left[\frac{E_t^i}{P_t^i} \; P^i_{(1977\text{-}78)} \right]}{\sum_i E^i_{(1977\text{-}78)}} \right] .100$$

where: E_t = enrolment for a specific age-sex group, in year t.

P_t = population for a specific age-sex group, in year t.

I_t = index of aggregate participation rate.

t = 1972-73 to 1977-78.

i = 28 age groups, (single years 17-40, and 5-year bands to 55+).

The participation rate for an individual single-year-age-group of enrolment, by sex, within a given category of enrolment is E_t^i / P_t^i.